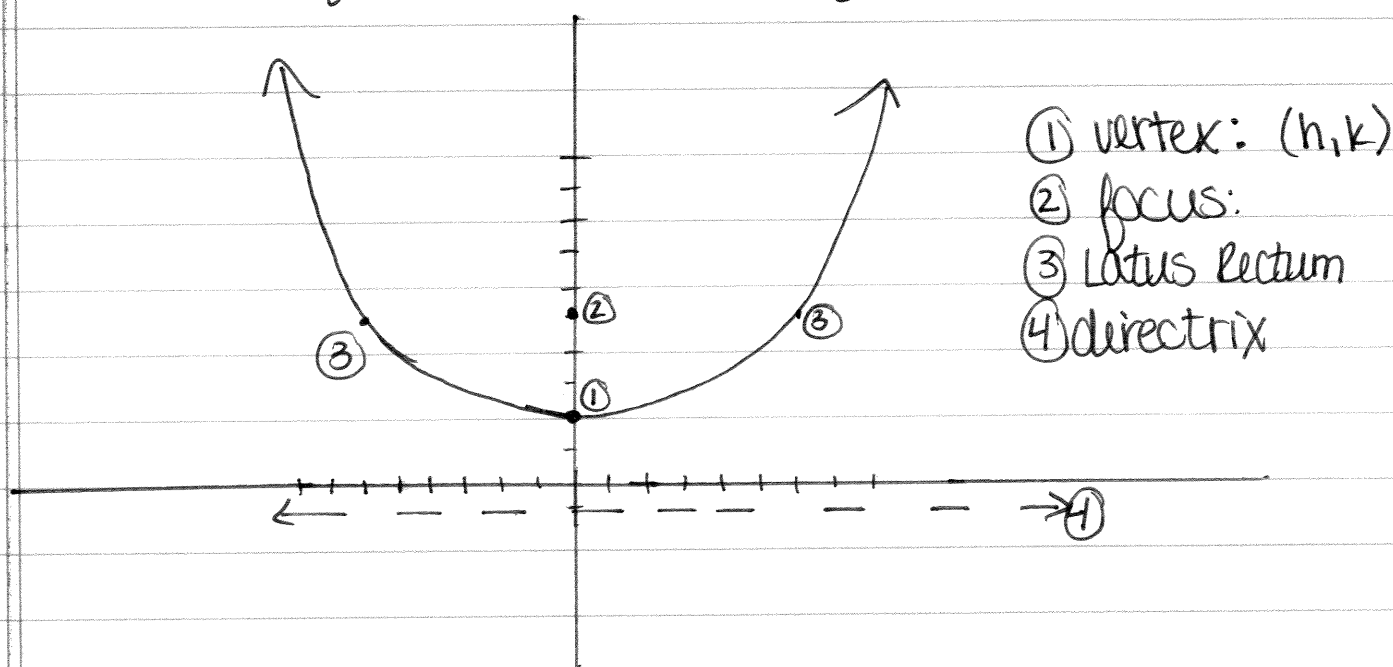


9.1 Notes - Parabolas

definitions:

parabola - a set of points in a plane that are equidistant from a fixed point (focus) and a fixed line (directrix)



ex: Find the equation for the parabola if the vertex is $(4, -2)$ and a focus is $(6, -2)$

① Because the y-values for the vertex & focus are the same, it is a y^2 parabola.

② work backwards!

$$(y+2)^2 = 4a(x-4)$$

a. plug in vertex

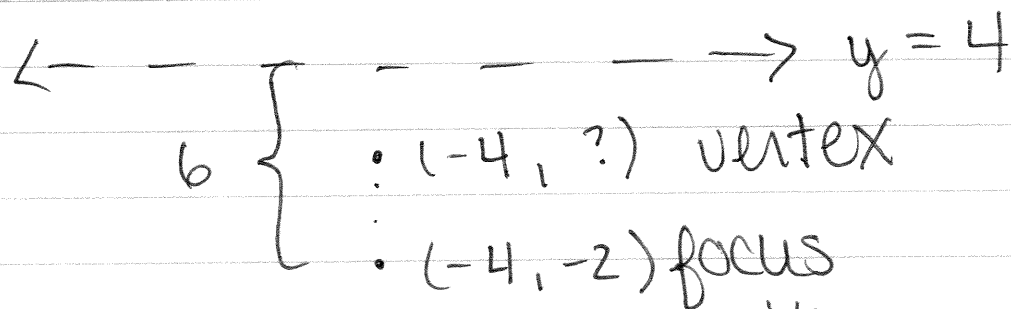
$$(y+2)^2 = 4(\underset{\downarrow}{2})(x-4)$$

b. find a: $6-4=2$

ex: find the equation of the parabola if the directrix is $y=4$ and the focus is $(-4, -2)$

① b/c the directrix is $y=$, it is an x^2 parabola

② the vertex is $\frac{1}{2}$ way btwn the directrix & the focus



vertex is @ $(-4, 1)$

b/c $(-2+3=1)$

$$(x+4)^2 = 4a(y-1)$$

to find a :

I know directrix $\Rightarrow y=4$ and $y=k-a$

$$4 = k - a = 1 - a$$

$$4 = 1 - a$$

$$-1 \quad -1$$

$$3 = -a$$

$$a = -3$$

$$\boxed{(x+4)^2 = 4(3)(y-1)}$$

$$(x-h)^2 = 4a(y-k)$$

$$(y-k)^2 = 4a(x-h)$$

parabolas!

x^2 or y^2

x^2 ↻ ↻

y^2 ↻ ↻

Step 1: vertex
(h, k)

$x = h$

Step 2: axis of
symmetry

$y = k$

Step 3: focus

(h, k+a)

(h+a, k)

Step 4: Directrix

$y = k - a$

Step 5:
Latus Rectum
points

$x = h - a$

(?₁, k+a)

(h+a, ?₁)

(?₂, k+a)

(h+a, ?₂)

* plug in the *
values you have
+ solve